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| 10/763,949 | 01/23/2004 | Andrei Darievich Mirzabekov | U 014998-5 | 5066 |
| 140 7590 03/19/2009 LADAS & PARRY LLP 26 WEST 61ST STREET NEW YORK, NY 10023 | | | | |
| EXAMINER | | | | |
| STEELE, AMBER D | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/763,949

Applicant(s)

MIRZABEKOV ET AL.

Examiner

AMBER D. STEELE

Art Unit

1639

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 52-77 is/are pending in the application.
- 4a) Of the above claim(s) 66-67, 69-71, and 76-77 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 52-65, 68 and 72-75 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of the Claims

1. Claims 1-34 were originally filed on January 23, 2004.

The amendment to the claims received on October 3, 2006 canceled claims 1-17 and added new claims 35-51.

The amendment to the claims received on May 23, 2007 canceled claims 18-51 and added new claims 52-77.

The amendment to the claims received on October 1, 2007 changed the status identifiers only.

The amendment to the claims received on November 27, 2007 amended claims 52, 54, and 59.

The amendment to the claims received on December 9, 2008 amended claims 52, 61, and 63.

Claims 52-77 are currently pending.

Claims 52-65, 68, and 72-75 are currently under consideration.

Election/Restrictions

2. Regarding the initial restriction, applicants elected, without traverse, Group XIX (claims 52-75) in the reply filed on October 1, 2007. Claims 76-77 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions.

3. Regarding the secondary restriction, applicants elected, without traverse, Group I (claims 65 and 68; linking claims 52-64 and 72-75) in the reply filed on March 24, 2008. Claims 66-67

Art Unit: 1639

and 69-71 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim.

4. Applicants elected, without traverse, H as the species of R^1 and R^2 , CH_3 as the species of R^3 , $(CH_2)_2OH$ as the species of R^4 , $p-C_6H_4$ as the species of Y, $(CH_2)_2OX$ as the species of Z, and POO_3H as the species of X in the reply filed on March 24, 2008.

Priority

5. The presently claimed invention claims status as a CON of PCT/RU01/00445 filed October 26, 2001 and claims foreign priority to RU 2001120905 filed July 25, 2001.

6. Since a certified copy and an English language translation of RU 2001120905 was not provided, intervening art is being utilized in the rejections (i.e. the present priority date perfected is October 26, 2001 which is the filing date of PCT/RU01/00445).

Invention as Claimed

7. Linking Claim: A biochip comprising an array of gel cells formed on a substrate by copolymerization of composition K wherein $K = aA + bB + cC + dD + eE$ wherein A is a monomer based on derivatives of acrylic and methacrylic acids; B is a water soluble cross-linking agent; C is a biological modified macromolecule bearing an unsaturated group; D is a water soluble compound as a medium component for performing a copolymerization; E is water, and a, b, c, d, and e are percentages (X) of each ingredient in the composition wherein for solids X is $m/v \times 100\%$ and for liquids X is $v/v \times 100\%$ wherein the total content of monomer and cross-linking agent is in a range from 3 to 40% ($3 \leq (a+b) \leq 40\%$) and a monomer to cross-linking

agent ration being within a range of 97:3 to 60:40 and percentages of C, D, and E ingredients being within a range of $0.0001\% \leq c \leq 10\%$; $0\% \leq d \leq 90\%$; $5\% \leq e \leq 95\%$; and wherein each cell may include an immobilized macromolecule and variations thereof.

8. The phrases “by copolymerization” and “performing a copolymerization” (claim 52) are considered product-by-process limitations. Claims 54-60 are considered product-by-process claims. See MPEP § 2113.

The intended use limitations of “used separately or as a mixture” (claims 62 and 64) are not provided patentable weight. See MPEP § 2106, section II.

The product-by-process/intended use limitations of claims 74-75 are not provided patentable weight. See MPEP § 2113 and § 2106, section II.

The limitations regarding the specific ratio/ranges of the various ingredients are considered normal optimization conditions in the art (see MPEP § 2144.05, section II).

The limitation of “may include an immobilized macromolecule” (claim 52) is considered an optional limitation.

Withdrawn Objections

9. The objections to claims 52, 61, and 63 are withdrawn in view of the claim amendments received on December 9, 2008.

10. The objection to claims 65 and 68 regarding r and t is withdrawn in view of applicants arguments.

Withdrawn Rejections

11. The rejection of claims 52-65, 68, and 72-75 under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Abrams et al. U.S. application publication 2003/0143569 published July 31, 2003 is withdrawn in view of the translation received for PCT/RU01/00445. However, it is noted that a translation of RU 2001120905 was not received, therefore, intervening art may be applied in a future Office action.

Maintained Rejections

12. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102/35 USC § 103

13. Claims 52-62, 64-65, 68, and 74-75 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Vasiliskov et al., Fabrication of Microarray of Gel-Immobilized Compounds on a Chip by Copolymerization, Biotechniques, 27: 592-606, 1999 (provided by applicants in the IDS).

For present claims 52-62, 64-65, 68, and 74-75, Vasiliskov et al. teach microarrays of gel cells with immobilized modified DNA (C) wherein acrylamide (A), bisacrylamide (B), TEMED (D), water, glycerol, etc. are copolymerized (please refer to the entire reference particularly the abstract; Materials and Methods; Figures 2-3).

Therefore, the presently claimed invention is anticipated by the teachings of Vasiliskov et al.

Arguments and Response

14. Applicants' arguments directed to the rejection under 35 USC 102 (b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Vasiliskov et al. for claims 52-62, 64-65, 68, and 74-75 were considered but are not persuasive for the following reasons.

Applicants contend that Vasiliskov et al. teach (A) acrylamide; (B) bisacrylamide; (C) allyl- or butendiololigonucleotides or acryloylmodified protein; (D,E) glycerol, sodium phosphate buffer, Tris-HCl, HCl, EDTA; TEMED; and methylene blue. Applicants contend that Vasiliskov et al. teaches TEMED (i.e. promoter of photo-initiated polymerization to a medium for photo-initiated polymerization) and methylene blue (i.e. photo-initiator). Applicants state that this differs from the presently claimed biochip because the biochips contain neither a promoter of polymerization nor a photo-initiator. In addition, applicants contend that the presently claimed biochips contain oligonucleotides containing methacrylamide, but not containing allyl as described by Vasiliskov et al. The applicants contend that the presently claimed invention has the unexpected result of polymerizing via photo-initiation upon irradiation in the ultra-violet region even in the absence of promoter and photo-initiators and the compositions can polymerize in a longer wave region upon UV-irradiation at a wavelength of > 312 nm on glass and in a dry oxygen-free atmosphere. Applicants further contend that an advantage of the presently claimed biochips is that they do not contain either a promoter or a photo-initiator.

Applicants' arguments are not convincing since the teachings of Vasiliskov et al. anticipate or, in the alternative, render *prima facie* obvious the biochip of the instant claims.

Regarding the additional reagents (i.e. promoter of polymerization, a photo-initiator, or allyl oligonucleotides) taught by Vasiliskov et al., it is noted that the presently claimed invention has open (i.e. comprising) claim language and, therefore, does not exclude additional reagents. See MPEP § 2111.03.

Regarding the attorney arguments regarding unexpected results and advantages, attorney argument is not evidence. See MPEP § 2145.

In addition, it is noted that the unexpected result and advantages discussed refer to the process of making the biochip and not to the final product which is presently claimed. See MPEP § 2113 regarding product-by-process limitations.

15. Claims 52-62, 64-65, 68, and 74-75 are rejected under 35 U.S.C. 103(a) as obvious over Rehman et al., Immobilization of acrylamide-modified oligonucleotides by co-polymerization, *Nucleic Acids Research*, 27(2): 649-655, 1999 (provided by applicants in the IDS).

For present claims 52-62, 64-65, 68, and 74-75, Rehman et al. teach microarrays of gel cells with immobilized acrylamide-modified DNA (C) wherein acrylamide (A), bisacrylamide (B), APS and TEMED (D), water, and glycerol are copolymerized (please refer to the entire reference particularly the abstract; Materials and Methods; Figures 2-3; Figure 1).

Therefore, the presently claimed invention is anticipated by the teachings of Rehman et al.

Arguments and Response

16. Applicants' arguments directed to the rejection under 35 USC 102 (b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rehman et al. for

claims 52-62, 64-65, 68, and 74-75 were considered but are not persuasive for the following reasons.

Applicants contend that the presently claimed biochip was produced by photopolymerization and not chemically initiated polymerization as taught by Rehman et al. Applicants contend that there is no disclosure of a photo- or a chemical initiator and APS (ammonium persulfate) and TEMED in the present application. Applicants contend that Rehman et al. teach (A) acrylamide, (B) bisacrylamide, (C) 5'-acrylamide oligonucleotide, (D, E) glycerol and phosphate buffer, and riboflavin which contains a photo-initiator. Applicants contend that the claimed biochip contains oligonucleotides containing a methacrylamide fragment, but not an acrylamide fragment as described in Rehman et al. Applicants also refer to General Organic Chemistry, v 3, Nitrogen-containing compounds, Ed. N. K. Kochetkov, Moscow, Khimiya, 1982, pp. 61-62.

Applicants' arguments are not convincing since the teachings of Rehman et al. anticipate the biochip of the instant claims.

The presently claimed invention is drawn to a biochip and not the process of making the biochip. Therefore, only the structural limitations regarding the final product will be provided patentable weight (see MPEP § 2113).

It is not clear why the lack of disclosure of a photo- or a chemical initiator and APS (ammonium persulfate) and TEMED in the present application is pertinent to the teachings of Rehman et al. or the present claims. Although the claims are interpreted in light of the specification, limitations from the specification (i.e. including negative limitations) are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding the additional reagents (i.e. photo-initiator or acrylamide oligonucleotides) taught by Rehman et al., it is noted that the presently claimed invention has open (i.e. comprising) claim language and, therefore, does not exclude additional reagents. See MPEP § 2111.03.

Regarding the reference relied upon, a copy was not received. Therefore, the reference has not been considered.

Claim Rejections - 35 USC § 103

17. Claims 52-65, 68, and 72-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vasiliskov et al., Fabrication of Microarray of Gel-Immobilized Compounds on a Chip by Copolymerization, Biotechniques, 27: 592-606, 1999 (provided by applicants in the IDS) and Solomon et al. U.S. Patent 6,585,873.

For present claims 52-62, 64-65, 68, and 74-75, Vasiliskov et al. teach microarrays of gel cells with immobilized modified DNA (C) wherein acrylamide (A), bisacrylamide (B), TEMED (D), water, and glycerol are copolymerized (please refer to the entire reference particularly the abstract; Materials and Methods; Figures 2-3).

However, Vasiliskov et al. does not teach the species of (B) recited in claim 63.

For present claim 63, Solomon et al. teach hydrophilic gels comprising copolymerized acrylamide, N,N'-methylenebisacrylamide, DMF, glycerol, and water (please refer to the entire specification particularly the abstract; Figure 1; columns 1-2, 6-7, 9; Examples 1-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hydrogel taught by Vasiliskov et al. with specific species of bisacrylamide taught by Solomon et al.

One having ordinary skill in the art would have been motivated to do this because Solomon et al. teaches that N,N- methylenebisacrylamide and acrylamide copolymerization is conventional in the art (please refer to column 1, lines 25-28).

One of ordinary skill in the art would have had a reasonable expectation of success in the modification of the hydrogel taught by Vasiliskov et al. with specific species of bisacrylamide taught by Solomon et al. because of the examples taught by Solomon et al. (see Example 5).

Therefore, the modification of the hydrogel taught by Vasiliskov et al. with specific species of bisacrylamide taught by Solomon et al. render the instant claims *prima facie* obvious.

Arguments and Response

18. Applicants' arguments directed to the rejection under 35 USC 103 (a) as being unpatentable over Vasiliskov et al. and Solomon et al. for claims 52-65, 68, and 72-75 were considered but are not persuasive for the following reasons.

Applicants contend that Solomon et al. also teach APS, TEMED, RBF, STS, or DPIC (i.e. initiator and promoter of chemical initiation of polymerization and/or photoinitiators with promoters of photo-initiation), the composition described by Solomon et al. did not contain oligonucleotides with an unsaturated group and were used for making hydrocarbon gels for electrophoresis, but not for making biochips.

Applicants' arguments are not convincing since the teachings of Vasiliskov et al. and Solomon et al. render the biochip of the instant claims *prima facie* obvious.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regarding the additional reagents (i.e. promoters, photoinitiators) taught by Solomon et al., it is noted that the presently claimed invention has open (i.e. comprising) claim language and, therefore, does not exclude additional reagents. See MPEP § 2111.03.

19. Claims 52-65, 68, and 72-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rehman et al., Immobilization of acrylamide-modified oligonucleotides by co-polymerization, Nucleic Acids Research, 27(2): 649-655, 1999 (provided by applicants in the IDS) and Solomon et al. U.S. Patent 6,585,873.

For present claims 52-62, 64-65, 68, and 74-75, Rehman et al. teach microarrays of gel cells with immobilized acrylamide-modified DNA (C) wherein acrylamide (A), bisacrylamide (B), APS and TEMED (D), water, and glycerol are copolymerized (please refer to the entire reference particularly the abstract; Materials and Methods; Figures 2-3).

However, Rehman et al. do not teach the species of (B) recited in claim 63.

For present claim 63, et al. Solomon teach hydrogels comprising acrylamide, N,N'-methylenebisacrylamide, DMF, glycerol, and water (please refer to the entire specification particularly the abstract; Figure 1; columns 1-2, 6-7, 9; Examples 1-20).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the hydrogel taught by Rehman et al. with specific species of bisacrylamide taught by Solomon et al.

One having ordinary skill in the art would have been motivated to do this because Solomon et al. teaches that N,N- methylenebisacrylamide and acrylamide copolymerization is conventional in the art (please refer to column 1, lines 25-28).

One of ordinary skill in the art would have had a reasonable expectation of success in the modification of the hydrogel taught by Rehman et al. with specific species of bisacrylamide taught by Solomon et al. because of the examples taught by Solomon et al. (see Example 5).

Therefore, the modification of the hydrogel taught by Rehman et al. with specific species of bisacrylamide taught by Solomon et al. render the instant claims *prima facie* obvious.

Arguments and Response

20. Applicants' arguments directed to the rejection under 35 USC 103 (a) as being unpatentable over Rehman et al. and Solomon et al. for claims 52-65, 68, and 72-75 were considered but are not persuasive for the following reasons.

Applicants contend that Solomon et al. also teach APS, TEMED, RBF, STS, or DPIC (i.e. initiator and promoter of chemical initiation of polymerization and/or photoinitiators with promoters of photo-initiation), the composition described by Solomon et al. did not contain oligonucleotides with an unsaturated group and were used for making hydrocarbon gels for electrophoresis, but not for making biochips.

Applicants' arguments are not convincing since the teachings of Rehman et al. and Solomon et al. render the biochip of the instant claims *prima facie* obvious.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regarding the additional reagents (i.e. promoters, photoinitiators) taught by Solomon et al., it is noted that the presently claimed invention has open (i.e. comprising) claim language and, therefore, does not exclude additional reagents. See MPEP § 2111.03.

Double Patenting

21. Claims 52-65, 68, and 72-75 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 25-54 of copending Application No. 10/450,641. Although the conflicting claims are not identical, they are not patentably distinct from each other because both the presently claimed invention and the invention as claimed in U.S. application 10/450,641 are drawn to biochips.

For present claims 52-65, 68, and 72-75, U.S. application 10/450,641 claims biochips with cells comprising immobilized molecules made by the method of polymerizing a composition comprising $K = aA + bB + cC + eE + fF$ wherein A is acrylamide, etc.; B is N,N'-methylenebisacrylamide, etc.; C is oligonucleotide, nucleic acid, etc.; D is a medium for performing polymerizing immobilization; and E is water, etc. and wherein a, b, c, d, and e are percentages (X) of each ingredient in the composition wherein for solids $X = m/v \times 100\%$ and for liquids $X = v/v \times 100\%$ wherein the total content of monomer and cross-linking agent is in a range from 3 to 40% ($3 \leq (a+b) \leq 40\%$) and a monomer to cross-linking agent ration being within a range of 97:3 to 60:40 and percentages of C, D, and E ingredients being within a range of $0.0001\% \leq c \leq 10\%$; $0\% \leq d \leq 90\%$; $5\% \leq e \leq 95\%$ (please refer to claims 25-54).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Arguments and Response

22. Applicants' arguments directed to the rejection on the ground of provisional nonstatutory obviousness-type double patenting as being unpatentable over 10/450,641 for claims 52-65, 68, and 72-75 were considered but are not persuasive for the following reasons.

Applicants request that the rejection be held in abeyance until allowable subject matter is indicated.

Applicants' arguments are not convincing since the claimed invention of 10/450,641 renders obvious the biochip of the instant claims. In addition, while a request may be made that objections or requirements as to form not necessary to further consideration of the claims be held in abeyance until allowable subject matter is indicated, the present is a rejection and will not be held in abeyance (see MPEP § 714.02).

Conclusion

23. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Future Communications

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMBER D. STEELE whose telephone number is (571)272-5538. The examiner can normally be reached on Monday through Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached on 571-272-0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Amber D. Steele/
Patent Examiner, Art Unit 1639

March 12, 2009